



FC-4-1.ST25.txt  
SEQUENCE LISTING

<110> Wisnewski, Nancy  
Becher, Anna M.  
Jarvis, Eric

<120> NOVEL FLEA ECDYSONE AND ULTRASPIRACLE NUCLEIC ACID MOLECULES, PROTEINS  
AND USES THEREOF

<130> FC-4-1

<140> 10/065,200

<141> 2002-09-25

<150> 09/435,019

<151> 1999-11-05

<150> 60/107,559

<151> 1998-11-06

<160> 71

<170> PatentIn version 3.1

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<211> 446

<212> DNA

<213> Ctenocephalides felis

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atcgcaagat tagtgtggta ccaagatgga tatgaacaac cttctgagga agacctacga 360  
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cggatcatgaa atgcgaccca ttacctcag aagcaactaa agtgaaattt ttgtcagaca	180
agattcttgc tgaaaacaga attcgaaatg ttccaccttt gactgcaaat caagaatatg	240
tgatcgcaag attagtgtgg taccaagatg gatatgaaca accttctgag gaagacctac	300
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atattgcagtc aaagggtggaa catttcgaat tctgttttca gcaagaatct tgtctgacaa	180
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caatttgtgt atgggtgatct tctaaaggat aaatgtgtga agtgaaatac cttgcattat 600  
caac atg aaa cga cgt tgg tct aac aac ggt ggc ttc caa acc ttg cgg 649  
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gcc ctg gct gcg ttg agt ccg gct tcg tta ggt tcg ccc gag aca tat 745  
Ala Leu Ala Ala Leu Ser Pro Ala Ser Leu Gly Ser Pro Glu Thr Tyr  
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gcc gag ctg gat ttg tgg gtg tac gag gaa gct ggc tta cat cca ggt 793  
Ala Glu Leu Asp Leu Trp Val Tyr Glu Glu Ala Gly Leu His Pro Gly  
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tca ggt gtg caa gga tgc ggt gcg gtc gcc gcc ttg cca tcg atc gcg 841  
Ser Gly Val Gln Gly Cys Gly Ala Val Ala Ala Leu Pro Ser Ile Ala  
65 70 75  
aca cag gtc ccc cta gga ttg ccc gct atg gac cta ccg cac acg cct 889  
Thr Gln Val Pro Leu Gly Leu Pro Ala Met Asp Leu Pro His Thr Pro  
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Arg Ser Asp Ser Ala Gly Ser Ile Ser Ser Gly Arg Glu Asp Leu Ser  
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Pro Pro Ser Ser Leu Asn Gly Tyr Ser Ala Asp Gly Cys Glu Ala Lys  
115 120 125  
aag gcc aag aaa ggg ccg gcg ccg cgg cag cag gag gaa cta tgt ctt 1033  
Lys Ala Lys Lys Gly Pro Ala Pro Arg Gln Gln Glu Glu Leu Cys Leu  
130 135 140  
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## FC-4-1.ST25.txt

Val Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu Thr Cys  
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 160 165 170 175

tac gtg tgc aag ttt ggg cac acg tgc gaa atg gac atg tat atg cga 1177  
 Tyr Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr Met Arg  
 180 185 190

cgc aaa tgt cag gaa tgt agg ctc aag aaa tgt ttg gct gtc gga atg 1225  
 Arg Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val Gly Met  
 195 200 205

cgc ccc gag tgc gtg gtt ccc gaa aac caa tgc gcc atg aag cga aag 1273  
 Arg Pro Glu Cys Val Val Pro Glu Asn Gln Cys Ala Met Lys Arg Lys  
 210 215 220

gaa aag aag gca cag aag gaa aag gac atc gga cca ata tca ggt acc 1321  
 Glu Lys Lys Ala Gln Lys Glu Lys Asp Ile Gly Pro Ile Ser Gly Thr  
 225 230 235

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 Val Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln Lys  
 240 245 250 255

cct gat att ttg cct gcg gtc atg aaa tgc gac cca tta cct cca gaa 1417  
 Pro Asp Ile Leu Pro Ala Val Met Lys Cys Asp Pro Leu Pro Pro Glu  
 260 265 270

gca act aaa gtg aaa ttt ttg tca gac aag att ctt gct gaa aac aga 1465  
 Ala Thr Lys Val Lys Phe Leu Ser Asp Lys Ile Leu Ala Glu Asn Arg  
 275 280 285

att cga aat gtt cca cct ttg act gca aat caa gaa tat gtg atc gca 1513  
 Ile Arg Asn Val Pro Pro Leu Thr Ala Asn Gln Glu Tyr Val Ile Ala  
 290 295 300

aga tta gtg tgg tac caa gat gga tat gaa caa cct tct gag gaa gac 1561  
 Arg Leu Val Trp Tyr Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp  
 305 310 315

cta cga agg ata atg ata agt aca cca gct gaa gat gaa gct ctt gaa 1609  
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 320 325 330 335

ttt cgg cat ata act gaa att acc ata ctt act gtg cag ctt ata gtg 1657  
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gaa ttt gca aag ggt tta cca gct ttt acc aaa ata cca caa gaa gat 1705  
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 355 360 365

caa ata aca tta tta aag gca tgt tca agt gaa gta atg atg ctg cga 1753  
 Gln Ile Thr Leu Leu Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg  
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aat cgt tca tat act cgt gac tcc tat aaa atg gct ggt atg gca gat	1849
Asn Arg Ser Tyr Thr Arg Asp Ser Tyr Lys Met Ala Gly Met Ala Asp	
400 405 410 415	
aca ata gaa gat cta ttg cat ttt tgt cga cag atg tat act atg act	1897
Thr Ile Glu Asp Leu Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr	
420 425 430	
gta gac aat gtg gag tat gca cta ata aca gca att gtg att ttt tca	1945
Val Asp Asn Val Glu Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser	
435 440 445	
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450 455 460	
tat tac atc aaa aca tta aag tgc tac att ttg aat cga cat agt ggt	2041
Tyr Tyr Ile Lys Thr Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly	
465 470 475	
gac cct aag tgt gga ata ttg ttt gcc aaa ctt ctt tct att ctt act	2089
Asp Pro Lys Cys Gly Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr	
480 485 490 495	
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Glu Leu Arg Thr Leu Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu	
500 505 510	
aaa ttg aag aac aga aaa ctt cct aga ttt tta gaa gaa att tgg gat	2185
Lys Leu Lys Asn Arg Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp	
515 520 525	
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Val Thr Asp Asn Val Pro Pro Thr Ile Asp Ser Met His Ser Val Ser	
530 535 540	
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Glu Asn Phe Tyr Asn Asn Glu Ser Asn Gly Thr Ser Asp Ser Thr Pro	
545 550 555	
atg taa agtgctcaga aaatcaacag ctcttttgca tatttggtta ctgtgtactg	2337
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ttaaaaagaa atcatgtgta ataaaatcat ttgtaggccg gccatactga tttacctata	2637
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FC-4-1.ST25.txt

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 35 40 45

Glu Leu Asp Leu Trp Val Tyr Glu Glu Ala Gly Leu His Pro Gly Ser  
 50 55 60

Gly Val Gln Gly Cys Gly Ala Val Ala Ala Leu Pro Ser Ile Ala Thr  
 65 70 75 80

Gln Val Pro Leu Gly Leu Pro Ala Met Asp Leu Pro His Thr Pro Arg  
 85 90 95

Ser Asp Ser Ala Gly Ser Ile Ser Ser Gly Arg Glu Asp Leu Ser Pro  
 100 105 110

Pro Ser Ser Leu Asn Gly Tyr Ser Ala Asp Gly Cys Glu Ala Lys Lys  
 115 120 125

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 130 135 140

Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu Thr Cys Glu  
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Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn Ala Val Tyr  
 165 170 175

FC-4-1.ST25.txt

Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr Met Arg Arg  
180 185 190

Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val Gly Met Arg  
195 200 205

Pro Glu Cys Val Val Pro Glu Asn Gln Cys Ala Met Lys Arg Lys Glu  
210 215 220

Lys Lys Ala Gln Lys Glu Lys Asp Ile Gly Pro Ile Ser Gly Thr Val  
225 230 235 240

Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln Lys Pro  
245 250 255

Asp Ile Leu Pro Ala Val Met Lys Cys Asp Pro Leu Pro Pro Glu Ala  
260 265 270

Thr Lys Val Lys Phe Leu Ser Asp Lys Ile Leu Ala Glu Asn Arg Ile  
275 280 285

Arg Asn Val Pro Pro Leu Thr Ala Asn Gln Glu Tyr Val Ile Ala Arg  
290 295 300

Leu Val Trp Tyr Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp Leu  
305 310 315 320

Arg Arg Ile Met Ile Ser Thr Pro Ala Glu Asp Glu Ala Leu Glu Phe  
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340 345 350

Phe Ala Lys Gly Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp Gln  
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Ile Thr Leu Leu Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg Met  
370 375 380

Ala Arg Arg Tyr Asp Ala Val Ser Asp Ser Ile Leu Phe Ala Asn Asn  
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Asp Asn Val Glu Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser Asp  
435 440 445

Arg Pro Gly Leu Glu Gln Ala Asp Leu Val Glu Gln Ile Gln Ser Tyr  
450 455 460

Tyr Ile Lys Thr Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly Asp  
465 470 475 480

Pro Lys Cys Gly Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr Glu  
485 490 495

Leu Arg Thr Leu Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu Lys  
500 505 510

Leu Lys Asn Arg Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp Val  
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catcttcgag catccgcaag	gtttggaagc caccgttggt	agaccaacgt cgtttcatgt	2220
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FC-4-1.ST25.txt

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ctc gaa gat gtt gca tct ggt gag gta acg tcg tct tct ggt ggc gcc 96
Leu Glu Asp Val Ala Ser Gly Glu Val Thr Ser Ser Ser Gly Gly Ala
20 25 30

ctg gct gcg ttg agt ccg gct tcg tta ggt tcg ccc gag aca tat gcc 144
Leu Ala Ala Leu Ser Pro Ala Ser Leu Gly Ser Pro Glu Thr Tyr Ala
35 40 45

gag ctg gat ttg tgg gtg tac gag gaa gct ggc tta cat cca ggt tca 192
Glu Leu Asp Leu Trp Val Tyr Glu Glu Ala Gly Leu His Pro Gly Ser
50 55 60

ggt gtg caa gga tgc ggt gcg gtc gcc gcc ttg cca tcg atc gcg aca 240
Gly Val Gln Gly Cys Gly Ala Val Ala Ala Leu Pro Ser Ile Ala Thr
65 70 75 80

cag gtc ccc cta gga ttg ccc gct atg gac cta ccg cac acg cct cgg 288
Gln Val Pro Leu Gly Leu Pro Ala Met Asp Leu Pro His Thr Pro Arg
85 90 95

agt gac agt gcg ggt agc atc tca tca gga cga gaa gac ctg tca ccg 336

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## FC-4-1.ST25.txt

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Pro	Ser	Ser	Leu	Asn	Gly	Tyr	Ser	Ala	Asp	Gly	Cys	Glu	Ala	Lys	Lys		
		115					120					125					
gcc	aag	aaa	ggg	ccg	gcg	ccg	cgg	cag	cag	gag	gaa	cta	tgt	ctt	gtg		432
Ala	Lys	Lys	Gly	Pro	Ala	Pro	Arg	Gln	Gln	Glu	Glu	Leu	Cys	Leu	Val		
		130					135				140						
tgc	ggc	gac	cgt	gcc	tcc	gga	tat	cat	tac	aac	gct	ctt	act	tgt	gaa		480
Cys	Gly	Asp	Arg	Ala	Ser	Gly	Tyr	His	Tyr	Asn	Ala	Leu	Thr	Cys	Glu		
145					150					155					160		
gga	tgc	aaa	ggt	ttt	ttc	cga	cga	agt	gtg	act	aag	aat	gcc	gtg	tac		528
Gly	Cys	Lys	Gly	Phe	Phe	Arg	Arg	Ser	Val	Thr	Lys	Asn	Ala	Val	Tyr		
				165					170					175			
gtg	tgc	aag	ttt	ggg	cac	acg	tgc	gaa	atg	gac	atg	tat	atg	cga	cgc		576
Val	Cys	Lys	Phe	Gly	His	Thr	Cys	Glu	Met	Asp	Met	Tyr	Met	Arg	Arg		
			180					185					190				
aaa	tgt	cag	gaa	tgt	agg	ctc	aag	aaa	tgt	ttg	gct	gtc	gga	atg	cgc		624
Lys	Cys	Gln	Glu	Cys	Arg	Leu	Lys	Lys	Cys	Leu	Ala	Val	Gly	Met	Arg		
		195					200					205					
ccc	gag	tgc	gtg	gtt	ccc	gaa	aac	caa	tgc	gcc	atg	aag	cga	aag	gaa		672
Pro	Glu	Cys	Val	Val	Pro	Glu	Asn	Gln	Cys	Ala	Met	Lys	Arg	Lys	Glu		
		210				215					220						
aag	aag	gca	cag	aag	gaa	aag	gac	atc	gga	cca	ata	tca	ggt	acc	gtt		720
Lys	Lys	Ala	Gln	Lys	Glu	Lys	Asp	Ile	Gly	Pro	Ile	Ser	Gly	Thr	Val		
225					230				235						240		
gga	aaa	tct	gct	gct	ccc	tta	gcg	aat	tct	gca	tta	ctt	cag	aag	cct		768
Gly	Lys	Ser	Ala	Ala	Pro	Leu	Ala	Asn	Ser	Ala	Leu	Leu	Gln	Lys	Pro		
				245				250						255			
gat	att	ttg	cct	gcg	gtc	atg	aaa	tgc	gac	cca	tta	cct	cca	gaa	gca		816
Asp	Ile	Leu	Pro	Ala	Val	Met	Lys	Cys	Asp	Pro	Leu	Pro	Pro	Glu	Ala		
			260				265						270				
act	aaa	gtg	aaa	ttt	ttg	tca	gac	aag	att	ctt	gct	gaa	aac	aga	att		864
Thr	Lys	Val	Lys	Phe	Leu	Ser	Asp	Lys	Ile	Leu	Ala	Glu	Asn	Arg	Ile		
		275					280					285					
cga	aat	gtt	cca	cct	ttg	act	gca	aat	caa	gaa	tat	gtg	atc	gca	aga		912
Arg	Asn	Val	Pro	Pro	Leu	Thr	Ala	Asn	Gln	Glu	Tyr	Val	Ile	Ala	Arg		
		290				295					300						
tta	gtg	tggt	tac	caa	gat	gga	tat	gaa	caa	cct	tct	gag	gaa	gac	cta		960
Leu	Val	Trp	Tyr	Gln	Asp	Gly	Tyr	Glu	Gln	Pro	Ser	Glu	Glu	Asp	Leu		
305					310					315					320		
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Arg	Arg	Ile	Met	Ile	Ser	Thr	Pro	Ala	Glu	Asp	Glu	Ala	Leu	Glu	Phe		
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cg	cat	ata	act	gaa	att	acc	ata	ctt	act	gtg	cag	ctt	ata	gtg	gaa	1056
Arg	His	Ile	Thr	Glu	Ile	Thr	Ile	Leu	Thr	Val	Gln	Leu	Ile	Val	Glu	
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Phe	Ala	Lys	Gly	Leu	Pro	Ala	Phe	Thr	Lys	Ile	Pro	Gln	Glu	Asp	Gln	
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ata	aca	tta	tta	aag	gca	tgt	tca	agt	gaa	gta	atg	atg	ctg	cga	atg	1152
Ile	Thr	Leu	Leu	Lys	Ala	Cys	Ser	Ser	Glu	Val	Met	Met	Leu	Arg	Met	
		370				375					380					
gct	cg	cg	tac	gat	gca	gtg	tcg	gat	tca	atc	tta	ttc	gcg	aat	aat	1200
Ala	Arg	Arg	Tyr	Asp	Ala	Val	Ser	Asp	Ser	Ile	Leu	Phe	Ala	Asn	Asn	
385					390					395					400	
cgt	tca	tat	act	cgt	gac	tcc	tat	aaa	atg	gct	gg	atg	gca	gat	aca	1248
Arg	Ser	Tyr	Thr	Arg	Asp	Ser	Tyr	Lys	Met	Ala	Gly	Met	Ala	Asp	Thr	
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ata	gaa	gat	cta	ttg	cat	ttt	tgt	cga	cag	atg	tat	act	atg	act	gta	1296
Ile	Glu	Asp	Leu	Leu	His	Phe	Cys	Arg	Gln	Met	Tyr	Thr	Met	Thr	Val	
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gac	aat	gtg	gag	tat	gca	cta	ata	aca	gca	att	gtg	att	ttt	tca	gat	1344
Asp	Asn	Val	Glu	Tyr	Ala	Leu	Ile	Thr	Ala	Ile	Val	Ile	Phe	Ser	Asp	
		435					440					445				
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Arg	Pro	Gly	Leu	Glu	Gln	Ala	Asp	Leu	Val	Glu	Gln	Ile	Gln	Ser	Tyr	
	450					455					460					
tac	atc	aaa	aca	tta	aag	tgc	tac	att	ttg	aat	cga	cat	agt	gg	gac	1440
Tyr	Ile	Lys	Thr	Leu	Lys	Cys	Tyr	Ile	Leu	Asn	Arg	His	Ser	Gly	Asp	
465					470				475						480	
cct	aag	tgt	gga	ata	ttg	ttt	gcc	aaa	ctt	ctt	tct	att	ctt	act	gaa	1488
Pro	Lys	Cys	Gly	Ile	Leu	Phe	Ala	Lys	Leu	Leu	Ser	Ile	Leu	Thr	Glu	
				485				490						495		
tta	cgc	acg	tta	gga	aat	caa	aac	tca	gaa	atg	tgt	ttt	gca	ctg	aaa	1536
Leu	Arg	Thr	Leu	Gly	Asn	Gln	Asn	Ser	Glu	Met	Cys	Phe	Ala	Leu	Lys	
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Leu	Lys	Asn	Arg	Lys	Leu	Pro	Arg	Phe	Leu	Glu	Glu	Ile	Trp	Asp	Val	
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aca	gat	aat	gtg	cct	cct	acg	ata	gac	agc	atg	cat	agt	gta	tcg	gag	1632
Thr	Asp	Asn	Val	Pro	Pro	Thr	Ile	Asp	Ser	Met	His	Ser	Val	Ser	Glu	
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aat	ttc	tat	aat	aat	gaa	agt	aat	gg	acc	agt	gat	tct	aca	cca	atg	1680
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&lt;212&gt; PRT

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 9

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Leu Glu Asp Val Ala Ser Gly Glu Val Thr Ser Ser Ser Gly Gly Ala  
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Leu Ala Ala Leu Ser Pro Ala Ser Leu Gly Ser Pro Glu Thr Tyr Ala  
 35 40 45

Glu Leu Asp Leu Trp Val Tyr Glu Glu Ala Gly Leu His Pro Gly Ser  
 50 55 60

Gly Val Gln Gly Cys Gly Ala Val Ala Ala Leu Pro Ser Ile Ala Thr  
 65 70 75 80

Gln Val Pro Leu Gly Leu Pro Ala Met Asp Leu Pro His Thr Pro Arg  
 85 90 95

Ser Asp Ser Ala Gly Ser Ile Ser Ser Gly Arg Glu Asp Leu Ser Pro  
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Pro Ser Ser Leu Asn Gly Tyr Ser Ala Asp Gly Cys Glu Ala Lys Lys  
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Ala Lys Lys Gly Pro Ala Pro Arg Gln Gln Glu Glu Leu Cys Leu Val  
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Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu Thr Cys Glu  
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Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn Ala Val Tyr  
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Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr Met Arg Arg  
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Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val Gly Met Arg  
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Pro Glu Cys Val Val Pro Glu Asn Gln Cys Ala Met Lys Arg Lys Glu  
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Lys Lys Ala Gln Lys Glu Lys Asp Ile Gly Pro Ile Ser Gly Thr Val  
225 230 235 240

Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln Lys Pro  
245 250 255

Asp Ile Leu Pro Ala Val Met Lys Cys Asp Pro Leu Pro Pro Glu Ala  
260 265 270

Thr Lys Val Lys Phe Leu Ser Asp Lys Ile Leu Ala Glu Asn Arg Ile  
275 280 285

Arg Asn Val Pro Pro Leu Thr Ala Asn Gln Glu Tyr Val Ile Ala Arg  
290 295 300

Leu Val Trp Tyr Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp Leu  
305 310 315 320

Arg Arg Ile Met Ile Ser Thr Pro Ala Glu Asp Glu Ala Leu Glu Phe  
325 330 335

Arg His Ile Thr Glu Ile Thr Ile Leu Thr Val Gln Leu Ile Val Glu  
340 345 350

Phe Ala Lys Gly Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp Gln  
355 360 365

Ile Thr Leu Leu Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg Met  
370 375 380

Ala Arg Arg Tyr Asp Ala Val Ser Asp Ser Ile Leu Phe Ala Asn Asn  
385 390 395 400

Arg Ser Tyr Thr Arg Asp Ser Tyr Lys Met Ala Gly Met Ala Asp Thr  
405 410 415

Ile Glu Asp Leu Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr Val  
420 425 430

Asp Asn Val Glu Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser Asp  
435 440 445

Arg Pro Gly Leu Glu Gln Ala Asp Leu Val Glu Gln Ile Gln Ser Tyr

450  
Tyr Ile Lys Thr Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly Asp  
465 470 475 480  
Pro Lys Cys Gly Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr Glu  
485 490 495  
Leu Arg Thr Leu Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu Lys  
500 505 510  
Leu Lys Asn Arg Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp Val  
515 520 525  
Thr Asp Asn Val Pro Pro Thr Ile Asp Ser Met His Ser Val Ser Glu  
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taacgtgcgt aattcagtaa gaatagaaag aagtttggca aacaatattc cacacttagg 240  
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ttgttccaca agatctgctt gttccaatcc aggtcgatct gaaaaaatca caattgctgt 360  
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tagatcttct attgtatctg ccataccagc cattttatag gagtcacgag tatatgaacg 480  
attattcgcg aataagattg aatccgacac tgcacgttac cgccgagcca ttgcgagcat 540  
cattacttca cttgaacatg cctttaataa tggtatttga tcttcttgtg gtattttggt 600  
aaaagctggg aaaccctttg caaattccac tataagctgc acagtaagta tggtaatttc 660  
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aggcaaaata tcaggcttct gaagtaatgc agaattcgct aaggagagcag cagattttcc	960
aacgggtacct gatattgggtc cgatgtcctt ttcttctgt gccttctttt ctttcgctt	1020
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cttgagccta cattcctgac atttgcgctg catatacatg tccatttcgc acgtgtgccc	1140
aaacttgcac acgtacacgg cattcttagt cacacttcgt cggaaaaaac ctttgcattc	1200
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ttctcctgc tgcgcggcg cgggccctt cttggccttc ttcgcttcgc agccatctgc	1320
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cgcactgtca ctccgaggcg tgtgcggtag gtccatagcg ggcaatccta gggggacctg	1440
tgtcgcgatc gatggcaagg cggcgaccgc accgcctct tgcacacctg aacctggatg	1500
taagccagct tctcgtaca cccacaaatc cagctcggca tatgtctcgg gcgaacctaa	1560
cgaagccgga ctcaacgcag ccaggcgcc accagaagac gacgttacct caccagatgc	1620
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tgcaaattct tctgatggaa ctgttttgaa cgaagttata catgaagatc ttctgcttaa	180
atgtgaaccc tctactagcg tggacgcatt atctaattga gctttcggtg gcaagcagca	240
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agaagacctg tcaccgcta gttctttgaa cggctattca gcagatggct gcgaagcgaa	480
gaaggccaag aaagggccgg cgccgcgga acaggaggaa ctatgtcttg tgtgcggcga	540
ccgtgcctcc ggatatcatt acaacgctct tacttgtgaa ggatgcaaag ggtttttccg	600
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acatgt

666

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 gaagaatagc cattagacaa tgtcgaatat ggtaagctgg atgggcctgg tgatggtgtg 360  
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 acatgtattg acaaaaaata agtaaaaaaa tagttcattg aatataatac ggtttcattc 180  
 gta atg ttt cga gcg gtt aca aat ctt gca aat tct tct gat gga act 228  
 Met Phe Arg Ala Val Thr Asn Leu Ala Asn Ser Ser Asp Gly Thr  
 1 5 10 15  
 gtt ttg aac gaa gtt ata cat gaa gat ctt ctg ctt aaa tgt gaa ccc 276  
 Val Leu Asn Glu Val Ile His Glu Asp Leu Leu Leu Lys Cys Glu Pro  
 20 25 30

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cag cac aaa gtc gaa gaa tgg aag cga tca cct agt ccc agt ttg acg	372
Gln His Lys Val Glu Glu Trp Lys Arg Ser Pro Ser Pro Ser Leu Thr	
50 55 60	
aac agc cat gtg cca cct ctc aca cca tca cca ggc cca tcc agc tta	420
Asn Ser His Val Pro Pro Leu Thr Pro Ser Pro Gly Pro Ser Ser Leu	
65 70 75	
cca tat tcg aca ttg tct aat ggc tat tct tcg cca atg tcg tca ggc	468
Pro Tyr Ser Thr Leu Ser Asn Gly Tyr Ser Ser Pro Met Ser Ser Gly	
80 85 90 95	
agc tgc gat ccc tat agc cct aat ggt aaa atg gga cga gaa gac ctg	516
Ser Cys Asp Pro Tyr Ser Pro Asn Gly Lys Met Gly Arg Glu Asp Leu	
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tca ccg cct agt tct ttg aac ggc tat tca gca gat ggc tgc gaa gcg	564
Ser Pro Pro Ser Ser Leu Asn Gly Tyr Ser Ala Asp Gly Cys Glu Ala	
115 120 125	
aag aag gcc aag aaa ggg ccg gcg ccg cgg cag cag gag gaa cta tgt	612
Lys Lys Ala Lys Lys Gly Pro Ala Pro Arg Gln Gln Glu Glu Leu Cys	
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Leu Val Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu Thr	
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Cys Glu Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn Ala	
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Val Tyr Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr Met	
180 185 190	
cga cgc aaa tgt cag gaa tgt agg ctc aag aaa tgt ttg gct gtc gga	804
Arg Arg Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val Gly	
195 200 205	
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Thr Val Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln	
240 245 250 255	
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Lys Pro Asp Ile Leu Pro Ala Val Met Lys Cys Asp Pro Leu Pro Pro	

260	265	270	
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cga atg gct cgg cgg tac gat gca gtg tcg gat tca atc tta ttc gcg Arg Met Ala Arg Arg Tyr Asp Ala Val Ser Asp Ser Ile Leu Phe Ala 385 390 395			1380
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agt tat tac atc aaa aca tta aag tgc tac att ttg aat cga cat agt Ser Tyr Tyr Ile Lys Thr Leu Lys Cys Tyr Ile Leu Asn Arg His Ser 465 470 475			1620
ggt gac cct aag tgt gga ata ttg ttt gcc aaa ctt ctt tct att ctt Gly Asp Pro Lys Cys Gly Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu 480 485 490 495			1668
act gaa tta cgc acg tta gga aat caa aac tca gaa atg tgt ttt gca			1716

## FC-4-1.ST25.txt

Thr	Glu	Leu	Arg	Thr	Leu	Gly	Asn	Gln	Asn	Ser	Glu	Met	Cys	Phe	Ala		
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Leu	Lys	Leu	Lys	Asn	Arg	Lys	Leu	Pro	Arg	Phe	Leu	Glu	Glu	Ile	Trp		
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gat	gtg	aca	gat	aat	gtg	cct	cct	acg	ata	gac	agc	atg	cat	agt	gta		1812
Asp	Val	Thr	Asp	Asn	Val	Pro	Pro	Thr	Ile	Asp	Ser	Met	His	Ser	Val		
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Pro	Met																
560																	
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FC-4-1.ST25.txt

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35 40 45

His Lys Val Glu Glu Trp Lys Arg Ser Pro Ser Pro Ser Leu Thr Asn  
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FC-4-1.ST25.txt

Ser His Val Pro Pro Leu Thr Pro Ser Pro Gly Pro Ser Ser Leu Pro  
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Tyr Ser Thr Leu Ser Asn Gly Tyr Ser Ser Pro Met Ser Ser Gly Ser  
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Pro Pro Ser Ser Leu Asn Gly Tyr Ser Ala Asp Gly Cys Glu Ala Lys  
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Lys Ala Lys Lys Gly Pro Ala Pro Arg Gln Gln Glu Glu Leu Cys Leu  
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Val Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu Thr Cys  
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Glu Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn Ala Val  
165 170 175

Tyr Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr Met Arg  
180 185 190

Arg Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val Gly Met  
195 200 205

Arg Pro Glu Cys Val Val Pro Glu Asn Gln Cys Ala Met Lys Arg Lys  
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Glu Lys Lys Ala Gln Lys Glu Lys Asp Ile Gly Pro Ile Ser Gly Thr  
225 230 235 240

Val Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln Lys  
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Pro Asp Ile Leu Pro Ala Val Met Lys Cys Asp Pro Leu Pro Pro Glu  
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Ile Arg Asn Val Pro Pro Leu Thr Ala Asn Gln Glu Tyr Val Ile Ala  
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Phe Arg His Ile Thr Glu Ile Thr Ile Leu Thr Val Gln Leu Ile Val  
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Glu Phe Ala Lys Gly Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp  
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Gln Ile Thr Leu Leu Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg  
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Thr Ile Glu Asp Leu Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr  
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Val Asp Asn Val Glu Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser  
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Asp Arg Pro Gly Leu Glu Gln Ala Asp Leu Val Glu Gln Ile Gln Ser  
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Tyr Tyr Ile Lys Thr Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly  
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Glu Leu Arg Thr Leu Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu  
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Val Thr Asp Asn Val Pro Pro Thr Ile Asp Ser Met His Ser Val Ser

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535

540

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## FC-4-1.ST25.txt

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FC-4-1.ST25.txt

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## FC-4-1.ST25.txt

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His Lys Val Glu Glu Trp Lys Arg Ser Pro Ser Pro Ser Leu Thr Asn	
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Ser His Val Pro Pro Leu Thr Pro Ser Pro Gly Pro Ser Ser Leu Pro	
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Tyr Ser Thr Leu Ser Asn Gly Tyr Ser Ser Pro Met Ser Ser Gly Ser	
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Cys Asp Pro Tyr Ser Pro Asn Gly Lys Met Gly Arg Glu Asp Leu Ser	
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Pro Pro Ser Ser Leu Asn Gly Tyr Ser Ala Asp Gly Cys Glu Ala Lys	
115 120 125	
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Lys Ala Lys Lys Gly Pro Ala Pro Arg Gln Gln Glu Glu Leu Cys Leu	
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Val Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu Thr Cys	
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Val Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln Lys	
245 250 255	
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## FC-4-1.ST25.txt

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FC-4-1.ST25.txt

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Tyr	Ser	Thr	Leu	Ser	Asn	Gly	Tyr	Ser	Ser	Pro	Met	Ser	Ser	Gly	Ser
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FC-4-1.ST25.txt

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195 200 205

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Val Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln Lys  
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Pro Asp Ile Leu Pro Ala Val Met Lys Cys Asp Pro Leu Pro Pro Glu  
260 265 270

Ala Thr Lys Val Lys Phe Leu Ser Asp Lys Ile Leu Ala Glu Asn Arg  
275 280 285

Ile Arg Asn Val Pro Pro Leu Thr Ala Asn Gln Glu Tyr Val Ile Ala  
290 295 300

Arg Leu Val Trp Tyr Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp  
305 310 315 320

Leu Arg Arg Ile Met Ile Ser Thr Pro Ala Glu Asp Glu Ala Leu Glu  
325 330 335

Phe Arg His Ile Thr Glu Ile Thr Ile Leu Thr Val Gln Leu Ile Val  
340 345 350

Glu Phe Ala Lys Gly Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp  
355 360 365

FC-4-1.ST25.txt

Gln Ile Thr Leu Leu Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg  
 370 375 380

Met Ala Arg Arg Tyr Asp Ala Val Ser Asp Ser Ile Leu Phe Ala Asn  
 385 390 395 400

Asn Arg Ser Tyr Thr Arg Asp Ser Tyr Lys Met Ala Gly Met Ala Asp  
 405 410 415

Thr Ile Glu Asp Leu Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr  
 420 425 430

Val Asp Asn Val Glu Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser  
 435 440 445

Asp Arg Pro Gly Leu Glu Gln Ala Asp Leu Val Glu Gln Ile Gln Ser  
 450 455 460

Tyr Tyr Ile Lys Thr Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly  
 465 470 475 480

Asp Pro Lys Cys Gly Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr  
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Glu Leu Arg Thr Leu Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu  
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Lys Leu Lys Asn Arg Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp  
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 <212> DNA  
 <213> Ctenocephalides felis

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## FC-4-1.ST25.txt

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<213> Ctenocephalides felis

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<212> DNA
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<210> 21
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gttttgacgt gttcgaagat gaacgatatt ttaaatatct tgtgtttagt tttagtctcg      180
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gcttataatt gagtatagga ataaactggt aatttcaatt ttttggtaac tccaaatggt      360
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FC-4-1.ST25.txt

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 <213> Ctenocephalides felis

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cttattcaat atataaaaga gttggaagct tttaacgtga ttcacagact aattcaatac	180
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FC-4-1.ST25.txt

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<210> 25

&lt;211&gt; 819

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 25

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&lt;210&gt; 26

&lt;211&gt; 1749

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;220&gt;

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&lt;222&gt; (306)..(1652)

&lt;223&gt;

&lt;400&gt; 26

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caata atg gaa agt gca gac aga ggc ttg gcc ctc gac caa ggg ctg tca      350
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## FC-4-1.ST25.txt

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ggc agt ccc gct agt ccg cct ttt ggt caa aat cac aca ata gta tca Gly Ser Pro Ala Ser Pro Pro Phe Gly Gln Asn His Thr Ile Val Ser 50 55 60	494
gga aac acg gcc acg ggc gcc caa acg aaa tca cca tac cct cca aat Gly Asn Thr Ala Thr Gly Ala Gln Thr Lys Ser Pro Tyr Pro Pro Asn 65 70 75	542
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gct tcc ggg aag cat tat ggt gtt tac agt tgc gaa ggt tgt aag gga Ala Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys Lys Gly 100 105 110	638
ttt ttc aaa cgg acg gta cga aaa gat ctg acg tat gcc tgt cga gag Phe Phe Lys Arg Thr Val Arg Lys Asp Leu Thr Tyr Ala Cys Arg Glu 115 120 125	686
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caa tat ttg cga gta gga cct tca tcc atg gtg cct cct aga tac aag Gln Tyr Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys 210 215 220	974
ggc cct gta tcc agt ctg tgt cag caa gca aat aaa cag tta tat cag Gly Pro Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln 225 230 235	1022
tta gta caa tac gca agg tgc atg ccg cat ttt agt gct tta caa tta Leu Val Gln Tyr Ala Arg Cys Met Pro His Ser Ala Leu Gln Leu	1070

FC-4-1.ST25.txt

240	245	250	255	
gag gat caa gta acg tta ctc aga gca gcc tgg aat gaa tta ctt ata				1118
Glu Asp Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile				
	260	265	270	
gca tct ata gcc tgg aga agt att gag tat cta gaa tcc gat gca gaa				1166
Ala Ser Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu				
	275	280	285	
aca agt acg tcc agt atg tct agt gat act tca aca agg aga cgc gct				1214
Thr Ser Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Ala				
	290	295	300	
cca cca gga ccg cct gaa tta atg tgt ttc ttt cct ggt atg acg tta				1262
Pro Pro Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu				
	305	310	315	
cat cgg aat agt gca atc cag gct ggc gtc gga cct att ttc gat cgg				1310
His Arg Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg				
	320	325	330	335
gta ctg tca gaa tta agt gtc aaa atg aga aga atg gat ttg gac aga				1358
Val Leu Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg				
	340	345	350	
gca gaa tta ggc tgt ttg aag gct ata ata ctg ttt aat cct gat att				1406
Ala Glu Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile				
	355	360	365	
cga gga ctg aaa tgt aga cag gaa gtg gat gct tta cga gaa aag gtt				1454
Arg Gly Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val				
	370	375	380	
tac gcg tgc ctg gac gag cat tgc agg acg cag cat cca gcg gaa gag				1502
Tyr Ala Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu				
	385	390	395	
ggt cgt ttc gca gcc ctg ctg ctt cgc ctg cca gct ctg agg tca atc				1550
Gly Arg Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile				
	400	405	410	415
tct ttg aaa tgt ctc gat cac ctg ttt ttc ttc aga ttg att ggc gat				1598
Ser Leu Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp				
	420	425	430	
acg ccg ctt gag agt ttt ctt gtg gat tta ctc gag gcc gga ccg atc				1646
Thr Pro Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile				
	435	440	445	
ggt tga gccgattcat ggataaaaga taagttttat gtattaagat gagaataagt				1702
Gly				
aaatattctg caaagttatt ttttctgcac gaatatttct acaagca				1749

<210> 27  
<211> 448



&lt;212&gt; PRT

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 27

Met Glu Ser Ala Asp Arg Gly Leu Ala Leu Asp Gln Gly Leu Ser Met  
 1 5 10 15

Ser Ser Met Gly Pro Leu Ser Pro Pro Asp Met Lys Pro Asp Pro Ala  
 20 25 30

Leu Leu Asn Gly Gly Phe Ser Pro Gly Ser Gly Gly Ala Val Val Gly  
 35 40 45

Ser Pro Ala Ser Pro Pro Phe Gly Gln Asn His Thr Ile Val Ser Gly  
 50 55 60

Asn Thr Ala Thr Gly Ala Gln Thr Lys Ser Pro Tyr Pro Pro Asn His  
 65 70 75 80

Pro Leu Ser Gly Ser Lys His Leu Cys Ser Ile Cys Gly Asp Arg Ala  
 85 90 95

Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe  
 100 105 110

Phe Lys Arg Thr Val Arg Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp  
 115 120 125

Arg Asn Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys  
 130 135 140

Arg Tyr Gln Lys Cys Leu Ala Cys Gly Met Lys Arg Glu Ala Val Gln  
 145 150 155 160

Glu Glu Arg Gln Arg Gly Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr  
 165 170 175

Ser Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu Gln  
 180 185 190

Arg Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile Gln  
 195 200 205

Tyr Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys Gly  
 210 215 220

FC-4-1.ST25.txt

Pro Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu  
225 230 235 240

Val Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu Gln Leu Glu  
245 250 255

Asp Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala  
260 265 270

Ser Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr  
275 280 285

Ser Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro  
290 295 300

Pro Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu His  
305 310 315 320

Arg Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg Val  
325 330 335

Leu Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg Ala  
340 345 350

Glu Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg  
355 360 365

Gly Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val Tyr  
370 375 380

Ala Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu Gly  
385 390 395 400

Arg Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser  
405 410 415

Leu Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr  
420 425 430

Pro Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
435 440 445

<210> 28

&lt;211&gt; 1749

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 28

tgcttgtaga aatattcgtg cagaaaaaat aactttgcag aatatttact tattctcatc	60
ttaatacata aaacttatct tttatccatg aatcggtca accgatcggc ccggcctcga	120
gtaaateccac aagaaaactc tcaagcggcg tatcgccaat caatctgaag aaaaacaggt	180
gatcgagaca tttcaaagag attgacctca gagctggcag gcgaagcagc agggctgcga	240
aacgaccctc ttccgctgga tgctgcgtcc tgcaatgctc gtccaggcac gcgtaaacct	300
tttctcgtaa agcatccact tcctgtctac atttcagtcc tcgaatatca ggattaaaca	360
gtattatagc cttcaaacag cctaattctg ctctgtccaa atccattctt ctcatcttga	420
cacttaattc tgacagtacc cgatcgaaaa taggtccgac gccagcctgg attgcactat	480
tccgatgtaa cgtcatacca ggaaagaaac acattaattc aggcgggtcct ggtggagcgc	540
gtctccttgt tgaagtatca ctgacatac tggacgtact tgtttctgca tcggattcta	600
gataactcaat acttctccag gctatagatg ctataagtaa ttcattccag gctgctctga	660
gtaacgttac ttgatcctct aattgtaaag cactaaaatg cggcatgcac cttgcgtatt	720
gtactaactg atataactgt ttatttgcct gctgacacag actggataca gggcccttgt	780
atctaggagg caccatggat gaaggctcta ctcgcaaata ttgtatcgac aattccgggt	840
ccgtcgcaac atttcgagtt tcaactcctt gttctgcttc taaaattctt tctaccgtta	900
aatcacgaac agaacttgctc ggggttgctt cttcattatt ctttgctcct cgttgctcgt	960
cttctctgcac ggcttctcgt ttcattccac aggcgagaca tttctgatat cgacagaact	1020
gacatcgatt tctctgcctt ttgtcgatca aacaatttct atcctctcga caggcatacg	1080
tcagatcttt tcgtaccgtc cgtttgaaaa atcccttaca accttcgcaa ctgtaaacac	1140
cataatgctt cccggaagcc ctatctccgc atatggagca cagatgtttt gaccgctca	1200
aaggatgatt tggaggggat ggtgatttcg tttgggcgcc cgtggccgtg tttctgata	1260
ctattgtgtg attttgacca aaaggcggac tagcgggact gccgacaact gcgccgccac	1320
tgccgggcca aaagccgccg ttcagtagcg caggatccgg tttcatatcc ggcggtgaga	1380
gcgggtcccat cgagctcatt gacagccctt ggtcgagggc caagcctctg tctgcacttt	1440
ccattattgt tccactaaac tagcagtatc actttttcac ttatttttagc ttttttgaac	1500
tgaactttta taaagcaaca ttatttaata tttgtataaa catggccgcg tactgtcact	1560
ctgtaaggtc gatgaactat caactatttc cttcaacaaa ctcatgaatt tcgttcatta	1620

## FC-4-1.ST25.txt

aacgatttat tttgaattaa cataacgcac tacttaacga taaaataaaa aacttggttaa 1680  
aagtaattgt gcaacataat tttaatttaa aatctcgtgc cgaattcctg cagccccggg 1740  
ggtccacta 1749

<210> 29  
<211> 1344  
<212> DNA  
<213> Ctenocephalides felis

<220>  
<221> CDS  
<222> (1)..(1344)  
<223>

<400> 29  
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Met Glu Ser Ala Asp Arg Gly Leu Ala Leu Asp Gln Gly Leu Ser Met  
1 5 10 15  
agc tcg atg gga ccg ctc tca ccg ccg gat atg aaa ccg gat cct gcg 96  
Ser Ser Met Gly Pro Leu Ser Pro Pro Asp Met Lys Pro Asp Pro Ala  
20 25 30  
cta ctg aac ggc ggc ttt tcg ccc ggc agt ggc ggc gca gtt gtc ggc 144  
Leu Leu Asn Gly Gly Phe Ser Pro Gly Ser Gly Gly Ala Val Val Gly  
35 40 45  
agt ccc gct agt ccg cct ttt ggt caa aat cac aca ata gta tca gga 192  
Ser Pro Ala Ser Pro Pro Phe Gly Gln Asn His Thr Ile Val Ser Gly  
50 55 60  
aac acg gcc acg ggc gcc caa acg aaa tca cca tac cct cca aat cat 240  
Asn Thr Ala Thr Gly Ala Gln Thr Lys Ser Pro Tyr Pro Pro Asn His  
65 70 75 80  
cct ttg agc ggg tca aaa cat ctg tgc tcc ata tgc gga gat agg gct 288  
Pro Leu Ser Gly Ser Lys His Leu Cys Ser Ile Cys Gly Asp Arg Ala  
85 90 95  
tcc ggg aag cat tat ggt gtt tac agt tgc gaa ggt tgt aag gga ttt 336  
Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe  
100 105 110  
ttc aaa cgg acg gta cga aaa gat ctg acg tat gcc tgt cga gag gat 384  
Phe Lys Arg Thr Val Arg Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp  
115 120 125  
aga aat tgt ttg atc gac aaa agg cag aga aat cga tgt cag ttc tgt 432  
Arg Asn Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys  
130 135 140  
cga tat cag aaa tgt ctc gcc tgt gga atg aaa cga gaa gcc gtg cag 480  
Arg Tyr Gln Lys Cys Leu Ala Cys Gly Met Lys Arg Glu Ala Val Gln  
145 150 155 160

## FC-4-1.ST25.txt

gaa gaa cga caa cga gga gca aag aat aat gaa gaa agc aac ccg aca	528
Glu Glu Arg Gln Arg Gly Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr	
165 170 175	
agt tct gtt cgt gat tta acg gta gaa aga att tta gaa gca gaa caa	576
Ser Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu Gln	
180 185 190	
agg agt gaa act cga aat gtt gcg acg gac ccg gaa ttg tcg ata caa	624
Arg Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile Gln	
195 200 205	
tat ttg cga gta gga cct tca tcc atg gtg cct cct aga tac aag ggc	672
Tyr Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys Gly	
210 215 220	
cct gta tcc agt ctg tgt cag caa gca aat aaa cag tta tat cag tta	720
Pro Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu	
225 230 235 240	
gta caa tac gca agg tgc atg ccg cat ttt agt gct tta caa tta gag	768
Val Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu Gln Leu Glu	
245 250 255	
gat caa gta acg tta ctc aga gca gcc tgg aat gaa tta ctt ata gca	816
Asp Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala	
260 265 270	
tct ata gcc tgg aga agt att gag tat cta gaa tcc gat gca gaa aca	864
Ser Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr	
275 280 285	
agt acg tcc agt atg tct agt gat act tca aca agg aga cgc gct cca	912
Ser Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro	
290 295 300	
cca gga ccg cct gaa tta atg tgt ttc ttt cct ggt atg acg tta cat	960
Pro Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu His	
305 310 315 320	
cgg aat agt gca atc cag gct ggc gtc gga cct att ttc gat cgg gta	1008
Arg Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg Val	
325 330 335	
ctg tca gaa tta agt gtc aaa atg aga aga atg gat ttg gac aga gca	1056
Leu Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg Ala	
340 345 350	
gaa tta ggc tgt ttg aag gct ata ata ctg ttt aat cct gat att cga	1104
Glu Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg	
355 360 365	
gga ctg aaa tgt aga cag gaa gtg gat gct tta cga gaa aag gtt tac	1152
Gly Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val Tyr	
370 375 380	
gcg tgc ctg gac gag cat tgc agg acg cag cat cca gcg gaa gag ggt	1200
Ala Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu Gly	
385 390 395 400	

FC-4-1.ST25.txt

cgt ttc gca gcc ctg ctg ctt cgc ctg cca gct ctg agg tca atc tct 1248  
Arg Phe Ala Ala Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser  
405 410 415

ttg aaa tgt ctc gat cac ctg ttt ttc ttc aga ttg att ggc gat acg 1296  
Leu Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr  
420 425 430

ccg ctt gag agt ttt ctt gtg gat tta ctc gag gcc gga ccg atc ggt 1344  
Pro Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
435 440 445

<210> 30  
<211> 448  
<212> PRT  
<213> Ctenocephalides felis

<400> 30

Met Glu Ser Ala Asp Arg Gly Leu Ala Leu Asp Gln Gly Leu Ser Met  
1 5 10 15

Ser Ser Met Gly Pro Leu Ser Pro Pro Asp Met Lys Pro Asp Pro Ala  
20 25 30

Leu Leu Asn Gly Gly Phe Ser Pro Gly Ser Gly Gly Ala Val Val Gly  
35 40 45

Ser Pro Ala Ser Pro Pro Phe Gly Gln Asn His Thr Ile Val Ser Gly  
50 55 60

Asn Thr Ala Thr Gly Ala Gln Thr Lys Ser Pro Tyr Pro Pro Asn His  
65 70 75 80

Pro Leu Ser Gly Ser Lys His Leu Cys Ser Ile Cys Gly Asp Arg Ala  
85 90 95

Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe  
100 105 110

Phe Lys Arg Thr Val Arg Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp  
115 120 125

Arg Asn Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys  
130 135 140

Arg Tyr Gln Lys Cys Leu Ala Cys Gly Met Lys Arg Glu Ala Val Gln  
145 150 155 160

Glu Glu Arg Gln Arg Gly Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr  
 165 170 175

Ser Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu Gln  
 180 185 190

Arg Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile Gln  
 195 200 205

Tyr Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys Gly  
 210 215 220

Pro Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu  
 225 230 235 240

Val Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu Gln Leu Glu  
 245 250 255

Asp Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala  
 260 265 270

Ser Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr  
 275 280 285

Ser Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro  
 290 295 300

Pro Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu His  
 305 310 315 320

Arg Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg Val  
 325 330 335

Leu Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg Ala  
 340 345 350

Glu Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg  
 355 360 365

Gly Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val Tyr  
 370 375 380

Ala Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu Gly

385

390

395

400

Arg Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser  
 405 410 415

Leu Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr  
 420 425 430

Pro Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
 435 440 445

&lt;210&gt; 31

&lt;211&gt; 1344

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 31

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gcgaagcagc agggctgcga aacgaccctc ttccgctgga tgctgcgtcc tgcaatgctc      180
gtccaggcac gcgtaaacct tttctcgtaa agcatccact tcctgtctac atttcagtcc      240
tcgaatatca ggattaaaca gtattatagc cttcaaacag cctaattctg ctctgtccaa      300
atccattctt ctcatcttga cacttaattc tgacagtacc cgatcgaaaa taggtccgac      360
gccagcctgg attgcactat tccgatgtaa cgtcatacca ggaaagaaac acattaattc      420
aggcggtcct ggtggagcgc gtctccttgt tgaagtatca ctagacatac tggacgtact      480
tgtttctgca tcggattcta gatactcaat acttctccag gctatagatg ctataagtaa      540
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cggcatgcac cttgcgtatt gtactaactg atataactgt ttatttgctt gctgacacag      660
actggataca gggcccttgt atctaggagg caccatggat gaaggtccta ctcgcaaata      720
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atcctctcga caggcatacg tcagatcttt tcgtaccgtc cgtttgaaaa atcccttaca     1020
accttcgcaa ctgtaaacac cataatgctt cccggaagcc ctatctccgc atatggagca     1080
cagatgtttt gacccgctca aaggatgatt tggagggtat ggtgatttcg tttgggcgcc     1140

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FC-4-1.ST25.txt

cgtggccgtg tttcctgata ctattgtgtg attttgacca aaaggcggac tagcgggact 1200  
gccgacaact gcgccgccac tgccggggcga aaagccgccg ttcagtagcg caggatccgg 1260  
tttcatatcc ggcggtgaga gcggtcccat cgagctcatt gacagccctt ggtcgagggc 1320  
caagcctctg tctgcacttt ccat 1344

<210> 32  
<211> 1975  
<212> DNA  
<213> Ctenocephalides felis

<220>  
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<222> (454)..(1878)  
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<400> 32  
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tgataagagt tgtgctttca taaaaaggaa ttgtttatta gattttgaat gacagtgtccc 180  
catgtgggag atgacatact gaacgtatta gtttatatgt tgcttataat tgagtatagg 240  
aataaactgt taattttcaat tttttggtaa ctccaaatgt tacctcaaaa acttaaagta 300  
aggggtcaa ataaaaaaag tgtcattaag aaattcaaca tgactagtac acatatcagt 360  
gagtgagttt atattagaaa tgaaggagac gcataaatgg taacttaatt aagcattaca 420  
atcaactggg aataaataaa tatatcttct aaa atg atg aaa gag aag cct 474  
Met Met Lys Lys Glu Lys Pro  
1 5  
atg atg tct gtg acg gct ttg att caa gga gcc gct cag aat caa ata 522  
Met Met Ser Val Thr Ala Leu Ile Gln Gly Ala Ala Gln Asn Gln Ile  
10 15 20  
tgg gga cga gga tta tct ggc ctt aca ggc ttg gcc ctc gac caa ggg 570  
Trp Gly Arg Gly Leu Ser Gly Leu Thr Gly Leu Ala Leu Asp Gln Gly  
25 30 35  
ctg tca atg agc tcg atg gga ccg ctc tca ctg ccg gat atg aaa ccg 618  
Leu Ser Met Ser Ser Met Gly Pro Leu Ser Leu Pro Asp Met Lys Pro  
40 45 50 55  
gat cct gcg cta ctg aac ggc ggc ttt tcg ccc ggc agt ggc ggc gca 666  
Asp Pro Ala Leu Leu Asn Gly Gly Phe Ser Pro Gly Ser Gly Gly Ala  
60 65 70  
gtt gtc ggc agt ccc gct agt ccg cct ttt ggt caa aat cac aca ata 714  
Val Val Gly Ser Pro Ala Ser Pro Pro Phe Gly Gln Asn His Thr Ile  
75 80 85

## FC-4-1.ST25.txt

gta tca gga aac acg gcc acg ggc gcc caa acg aaa tca cca tac cct	762
Val Ser Gly Asn Thr Ala Thr Gly Ala Gln Thr Lys Ser Pro Tyr Pro	
90 95 100	
cca aat cat cct ttg agc ggg tca aaa cat ctg tgc tcc ata tgc gga	810
Pro Asn His Pro Leu Ser Gly Ser Lys His Leu Cys Ser Ile Cys Gly	
105 110 115	
gat agg gct tcc ggg aag cat tat ggt gtt tac agt tgc gaa ggt tgt	858
Asp Arg Ala Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys	
120 125 130 135	
aag gga ttt ttc aaa cgg acg gta cga aaa gat ctg acg tat gcc tgt	906
Lys Gly Phe Phe Lys Arg Thr Val Arg Lys Asp Leu Thr Tyr Ala Cys	
140 145 150	
cga gag gat aga aat tgt ttg atc gac aaa agg cag aga aat cga tgt	954
Arg Glu Asp Arg Asn Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys	
155 160 165	
cag ttc tgt cga tat cag aaa tgt ctc gcc tgt gga atg aaa cga gaa	1002
Gln Phe Cys Arg Tyr Gln Lys Cys Leu Ala Cys Gly Met Lys Arg Glu	
170 175 180	
gcc gtg cag gaa gaa cga caa cga gga gca aag aat aat gaa gaa agc	1050
Ala Val Gln Glu Glu Arg Gln Arg Gly Ala Lys Asn Asn Glu Glu Ser	
185 190 195	
aac ccg aca agt tct gtt cgt gat tta acg gta gaa aga att tta gaa	1098
Asn Pro Thr Ser Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu	
200 205 210 215	
gca gaa caa agg agt gaa act cga aat gtt gcg acg gac ccg gaa ttg	1146
Ala Glu Gln Arg Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu	
220 225 230	
tcg ata caa tat ttg cga gta gga cct tca tcc atg gtg cct cct aga	1194
Ser Ile Gln Tyr Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg	
235 240 245	
tac aag ggc cct gta tcc agt ctg tgt cag caa gca aat aaa cag tta	1242
Tyr Lys Gly Pro Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu	
250 255 260	
tat cag tta gta caa tac gca agg tgc atg ccg cat ttt agt gct tta	1290
Tyr Gln Leu Val Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu	
265 270 275	
caa tta gag gat caa gta acg tta ctc aga gca gcc tgg aat gaa tta	1338
Gln Leu Glu Asp Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu	
280 285 290 295	
ctt ata gca tct ata gcc tgg aga agt att gag tat cta gaa tcc gat	1386
Leu Ile Ala Ser Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp	
300 305 310	
gca gaa aca agt acg tcc agt atg tct agt gat act tca aca agg aga	1434
Ala Glu Thr Ser Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg	
315 320 325	

FC-4-1.ST25.txt

cgc gct cca cca gga ccg cct gaa tta atg tgt ttc ttt cct ggt atg Arg Ala Pro Pro Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met 330 335 340	1482
acg tta cat cgg aat agt gca atc cag gct ggc gtc gga cct att ttc Thr Leu His Arg Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe 345 350 355	1530
gat cgg gta ctg tca gaa tta agt gtc aaa atg aga aga atg gat ttg Asp Arg Val Leu Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu 360 365 370 375	1578
gac aga gca gaa tta ggc tgt ttg aag gct ata ata ctg ttt aat cct Asp Arg Ala Glu Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro 380 385 390	1626
gat att cga gga ctg aaa tgt aga cag gaa gtg gat gct tta cga gaa Asp Ile Arg Gly Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu 395 400 405	1674
aag gtt tac gcg tgc ctg gac gag cat tgc agg acg cag cat cca gcg Lys Val Tyr Ala Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala 410 415 420	1722
gaa gag ggt cgt ttc gca gcc ctg ctg ctt cgc ctg cca gct ctg agg Glu Glu Gly Arg Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg 425 430 435	1770
tca atc tct ttg aaa tgt ctc gat cac ctg ttt ttc ttc aga ttg att Ser Ile Ser Leu Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile 440 445 450 455	1818
ggc gat acg ccg ctt gag agt ttt ctt gtg gat tta ctc gag gcc gga Gly Asp Thr Pro Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly 460 465 470	1866
ccg atc ggt tga gccgattcat ggataaaaaga taagttttat gtattaagat Pro Ile Gly	1918
gagaataagt aaatattctg caaagttatt ttttctgcac gaatatttct acaagca	1975

<210> 33  
 <211> 474  
 <212> PRT  
 <213> Ctenocephalides felis

<400> 33

Met Met Lys Lys Glu Lys Pro Met Met Ser Val Thr Ala Leu Ile Gln
1 5 10 15

Gly Ala Ala Gln Asn Gln Ile Trp Gly Arg Gly Leu Ser Gly Leu Thr
20 25 30

FC-4-1.ST25.txt

Gly Leu Ala Leu Asp Gln Gly Leu Ser Met Ser Ser Met Gly Pro Leu  
35 40 45

Ser Leu Pro Asp Met Lys Pro Asp Pro Ala Leu Leu Asn Gly Gly Phe  
50 55 60

Ser Pro Gly Ser Gly Gly Ala Val Val Gly Ser Pro Ala Ser Pro Pro  
65 70 75 80

Phe Gly Gln Asn His Thr Ile Val Ser Gly Asn Thr Ala Thr Gly Ala  
85 90 95

Gln Thr Lys Ser Pro Tyr Pro Pro Asn His Pro Leu Ser Gly Ser Lys  
100 105 110

His Leu Cys Ser Ile Cys Gly Asp Arg Ala Ser Gly Lys His Tyr Gly  
115 120 125

Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys Arg Thr Val Arg  
130 135 140

Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp Arg Asn Cys Leu Ile Asp  
145 150 155 160

Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys Arg Tyr Gln Lys Cys Leu  
165 170 175

Ala Cys Gly Met Lys Arg Glu Ala Val Gln Glu Glu Arg Gln Arg Gly  
180 185 190

Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr Ser Ser Val Arg Asp Leu  
195 200 205

Thr Val Glu Arg Ile Leu Glu Ala Glu Gln Arg Ser Glu Thr Arg Asn  
210 215 220

Val Ala Thr Asp Pro Glu Leu Ser Ile Gln Tyr Leu Arg Val Gly Pro  
225 230 235 240

Ser Ser Met Val Pro Pro Arg Tyr Lys Gly Pro Val Ser Ser Leu Cys  
245 250 255

Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu Val Gln Tyr Ala Arg Cys  
260 265 270

FC-4-1.ST25.txt

Met Pro His Phe Ser Ala Leu Gln Leu Glu Asp Gln Val Thr Leu Leu  
275 280 285

Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala Ser Ile Ala Trp Arg Ser  
290 295 300

Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr Ser Thr Ser Ser Met Ser  
305 310 315 320

Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro Pro Gly Pro Pro Glu Leu  
325 330 335

Met Cys Phe Phe Pro Gly Met Thr Leu His Arg Asn Ser Ala Ile Gln  
340 345 350

Ala Gly Val Gly Pro Ile Phe Asp Arg Val Leu Ser Glu Leu Ser Val  
355 360 365

Lys Met Arg Arg Met Asp Leu Asp Arg Ala Glu Leu Gly Cys Leu Lys  
370 375 380

Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg Gly Leu Lys Cys Arg Gln  
385 390 395 400

Glu Val Asp Ala Leu Arg Glu Lys Val Tyr Ala Cys Leu Asp Glu His  
405 410 415

Cys Arg Thr Gln His Pro Ala Glu Glu Gly Arg Phe Ala Ala Leu Leu  
420 425 430

Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser Leu Lys Cys Leu Asp His  
435 440 445

Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr Pro Leu Glu Ser Phe Leu  
450 455 460

Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
465 470

<210> 34  
<211> 1975  
<212> DNA  
<213> Ctenocephalides felis

<400> 34

## FC-4-1.ST25.txt

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ttaatacata aaacttatct tttatccatg aatcggtca accgatcggg ccggcctcga	120
gtaaatccac aagaaaactc tcaagcggcg tatcgccaat caatctgaag aaaaacaggt	180
gatcgagaca tttcaaagag attgacctca gagctggcag gcgaagcagc agggctgcga	240
aacgaccctc ttccgctgga tgctgcgtcc tgcaatgctc gtccaggcac gcgtaaacct	300
tttctcgtaa agcatccact tcctgtctac atttcagtcc tcgaatatca ggattaaaca	360
gtattatagc cttcaaacag cctaattctg ctctgtccaa atccattctt ctcatcttga	420
cacttaattc tgacagtacc cgatcgaaaa taggtccgac gccagcctgg attgcactat	480
tccgatgtaa cgtcatacca ggaaagaaac acattaattc aggcggctcct ggtggagcgc	540
gtctccttgt tgaagtatca ctagacatac tggacgtact tgtttctgca tcggattcta	600
gataactcaat acttctccag gctatagatg ctataagtaa ttcattccag gctgctctga	660
gtaacgttac ttgatcctct aattgtaaag cactaaaatg cggcatgcac cttgctgatt	720
gtactaactg atataactgt ttatttgctt gctgacacag actggataca gggcccttgt	780
atctaggagg caccatggat gaaggctcta ctcgcaaata ttgtatcgac aattccgggt	840
ccgtcgcaac atttcgagtt tcactccttt gttctgcttc taaaattctt tctaccgtta	900
aatcacgaac agaacttgctc ggggttgcttt cttcattatt ctttgctect cgttgctggt	960
cttcctgcac ggcttctcgt ttcattccac aggcgagaca tttctgatat cgacagaact	1020
gacatcgatt tctctgcctt ttgtcgatca aacaatttct atcctctcga caggcatacg	1080
tcagatcttt tcgtaccgtc cgtttgaaaa atcccttaca accttcgcaa ctgtaaacac	1140
cataatgctt cccggaagcc ctatctccgc atatggagca cagatgtttt gacccgctca	1200
aaggatgatt tggaggggat ggtgatttcg tttgggccc cgtggccgtg tttcctgata	1260
ctattgtgtg attttgacca aaaggcggac tagcgggact gccgacaact gcgccgccac	1320
tgccgggcga aaagccgccg ttcagtagcg caggatccgg tttcatatcc ggcagtgaga	1380
gcggtcccat cgagctcatt gacagccctt ggtcgagggc caagcctgta aggccagata	1440
atcctcgtcc ccatatttga ttctgagcgg ctccctgaat caaagccgtc acagacatca	1500
taggcttctc ttttttcatc attttagaag atatatttat ttattcccag ttgattgtaa	1560
tgcttaatta agttaccatt tatgcgtctc cttcatttct aatataaact cactcactga	1620
tatgtgtact agtcatgttg aatttcttaa tgacactttt tttatatttg acccttactt	1680
taagtttttg aggtaacatt tggagttacc aaaaaattga aattaacagt ttattcctat	1740
actcaattat aagcaacata taaactaata cgttcagtat gtcactctcc acatggggca	1800

ctgtcattca aaatctaata aacaattcct ttttatgaaa gcacaactct tatcacacag 1860  
 cacaaaaatt atctcgagac taaaactaaa cacaaaatat ttaaaatata gttcatcttc 1920  
 gaacacgtca aaacaaaccg agtcgcgcgc ataccatcac ttcaatcact tgact 1975

<210> 35  
 <211> 1422  
 <212> DNA  
 <213> Ctenocephalides felis

<220>  
 <221> CDS  
 <222> (1)..(1422)  
 <223>

<400> 35  
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 Met Met Lys Lys Glu Lys Pro Met Met Ser Val Thr Ala Leu Ile Gln  
 1 5 10 15  
 gga gcc gct cag aat caa ata tgg gga cga gga tta tct ggc ctt aca 96  
 Gly Ala Ala Gln Asn Gln Ile Trp Gly Arg Gly Leu Ser Gly Leu Thr  
 20 25 30  
 ggc ttg gcc ctc gac caa ggg ctg tca atg agc tcg atg gga ccg ctc 144  
 Gly Leu Ala Leu Asp Gln Gly Leu Ser Met Ser Ser Met Gly Pro Leu  
 35 40 45  
 tca ctg ccg gat atg aaa ccg gat cct gcg cta ctg aac ggc ggc ttt 192  
 Ser Leu Pro Asp Met Lys Pro Asp Pro Ala Leu Leu Asn Gly Gly Phe  
 50 55 60  
 tcg ccc ggc agt ggc ggc gca gtt gtc ggc agt ccc gct agt ccg cct 240  
 Ser Pro Gly Ser Gly Gly Ala Val Val Gly Ser Pro Ala Ser Pro Pro  
 65 70 75 80  
 ttt ggt caa aat cac aca ata gta tca gga aac acg gcc acg ggc gcc 288  
 Phe Gly Gln Asn His Thr Ile Val Ser Gly Asn Thr Ala Thr Gly Ala  
 85 90 95  
 caa acg aaa tca cca tac cct cca aat cat cct ttg agc ggc tca aaa 336  
 Gln Thr Lys Ser Pro Tyr Pro Pro Asn His Pro Leu Ser Gly Ser Lys  
 100 105 110  
 cat ctg tgc tcc ata tgc gga gat agg gct tcc ggc aag cat tat ggt 384  
 His Leu Cys Ser Ile Cys Gly Asp Arg Ala Ser Gly Lys His Tyr Gly  
 115 120 125  
 gtt tac agt tgc gaa ggt tgt aag gga ttt ttc aaa cgg acg gta cga 432  
 Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys Arg Thr Val Arg  
 130 135 140  
 aaa gat ctg acg tat gcc tgt cga gag gat aga aat tgt ttg atc gac 480  
 Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp Arg Asn Cys Leu Ile Asp  
 145 150 155 160

## FC-4-1.ST25.txt

aaa agg cag aga aat cga tgt cag ttc tgt cga tat cag aaa tgt ctc	528
Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys Arg Tyr Gln Lys Cys Leu	
165 170 175	
gcc tgt gga atg aaa cga gaa gcc gtg cag gaa gaa cga caa cga gga	576
Ala Cys Gly Met Lys Arg Glu Ala Val Gln Glu Glu Arg Gln Arg Gly	
180 185 190	
gca aag aat aat gaa gaa agc aac ccg aca agt tct gtt cgt gat tta	624
Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr Ser Ser Val Arg Asp Leu	
195 200 205	
acg gta gaa aga att tta gaa gca gaa caa agg agt gaa act cga aat	672
Thr Val Glu Arg Ile Leu Glu Ala Glu Gln Arg Ser Glu Thr Arg Asn	
210 215 220	
gtt gcg acg gac ccg gaa ttg tcg ata caa tat ttg cga gta gga cct	720
Val Ala Thr Asp Pro Glu Leu Ser Ile Gln Tyr Leu Arg Val Gly Pro	
225 230 235 240	
tca tcc atg gtg cct cct aga tac aag ggc cct gta tcc agt ctg tgt	768
Ser Ser Met Val Pro Pro Arg Tyr Lys Gly Pro Val Ser Ser Leu Cys	
245 250 255	
cag caa gca aat aaa cag tta tat cag tta gta caa tac gca agg tgc	816
Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu Val Gln Tyr Ala Arg Cys	
260 265 270	
atg ccg cat ttt agt gct tta caa tta gag gat caa gta acg tta ctc	864
Met Pro His Phe Ser Ala Leu Gln Leu Glu Asp Gln Val Thr Leu Leu	
275 280 285	
aga gca gcc tgg aat gaa tta ctt ata gca tct ata gcc tgg aga agt	912
Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala Ser Ile Ala Trp Arg Ser	
290 295 300	
att gag tat cta gaa tcc gat gca gaa aca agt acg tcc agt atg tct	960
Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr Ser Thr Ser Ser Met Ser	
305 310 315 320	
agt gat act tca aca agg aga cgc gct cca cca gga ccg cct gaa tta	1008
Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro Pro Gly Pro Pro Glu Leu	
325 330 335	
atg tgt ttc ttt cct ggt atg acg tta cat cgg aat agt gca atc cag	1056
Met Cys Phe Phe Pro Gly Met Thr Leu His Arg Asn Ser Ala Ile Gln	
340 345 350	
gct ggc gtc gga cct att ttc gat cgg gta ctg tca gaa tta agt gtc	1104
Ala Gly Val Gly Pro Ile Phe Asp Arg Val Leu Ser Glu Leu Ser Val	
355 360 365	
aaa atg aga aga atg gat ttg gac aga gca gaa tta ggc tgt ttg aag	1152
Lys Met Arg Arg Met Asp Leu Asp Arg Ala Glu Leu Gly Cys Leu Lys	
370 375 380	
gct ata ata ctg ttt aat cct gat att cga gga ctg aaa tgt aga cag	1200
Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg Gly Leu Lys Cys Arg Gln	



FC-4-1.ST25.txt

385	390	395	400	
gaa gtg gat gct tta cga gaa aag gtt tac gcg tgc ctg gac gag cat				1248
Glu Val Asp Ala Leu Arg Glu Lys Val Tyr Ala Cys Leu Asp Glu His				
	405	410	415	
tgc agg acg cag cat cca gcg gaa gag ggt cgt ttc gca gcc ctg ctg				1296
Cys Arg Thr Gln His Pro Ala Glu Glu Gly Arg Phe Ala Ala Leu Leu				
	420	425	430	
ctt cgc ctg cca gct ctg agg tca atc tct ttg aaa tgt ctc gat cac				1344
Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser Leu Lys Cys Leu Asp His				
	435	440	445	
ctg ttt ttc ttc aga ttg att ggc gat acg ccg ctt gag agt ttt ctt				1392
Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr Pro Leu Glu Ser Phe Leu				
	450	455	460	
gtg gat tta ctc gag gcc gga ccg atc ggt				1422
Val Asp Leu Leu Glu Ala Gly Pro Ile Gly				
	465	470		

<210> 36  
 <211> 474  
 <212> PRT  
 <213> Ctenocephalides felis

<400> 36

Met Met Lys Lys Glu Lys Pro Met Met Ser Val Thr Ala Leu Ile Gln				
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	20	25	30	
Gly Leu Ala Leu Asp Gln Gly Leu Ser Met Ser Ser Met Gly Pro Leu				
	35	40	45	
Ser Leu Pro Asp Met Lys Pro Asp Pro Ala Leu Leu Asn Gly Gly Phe				
	50	55	60	
Ser Pro Gly Ser Gly Gly Ala Val Val Gly Ser Pro Ala Ser Pro Pro				
	65	70	75	80
Phe Gly Gln Asn His Thr Ile Val Ser Gly Asn Thr Ala Thr Gly Ala				
	85	90	95	
Gln Thr Lys Ser Pro Tyr Pro Pro Asn His Pro Leu Ser Gly Ser Lys				
	100	105	110	
His Leu Cys Ser Ile Cys Gly Asp Arg Ala Ser Gly Lys His Tyr Gly				

115  
 Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys Arg Thr Val Arg  
 130 135 140  
 Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp Arg Asn Cys Leu Ile Asp  
 145 150 155 160  
 Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys Arg Tyr Gln Lys Cys Leu  
 165 170 175  
 Ala Cys Gly Met Lys Arg Glu Ala Val Gln Glu Glu Arg Gln Arg Gly  
 180 185 190  
 Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr Ser Ser Val Arg Asp Leu  
 195 200 205  
 Thr Val Glu Arg Ile Leu Glu Ala Glu Gln Arg Ser Glu Thr Arg Asn  
 210 215 220  
 Val Ala Thr Asp Pro Glu Leu Ser Ile Gln Tyr Leu Arg Val Gly Pro  
 225 230 235 240  
 Ser Ser Met Val Pro Pro Arg Tyr Lys Gly Pro Val Ser Ser Leu Cys  
 245 250 255  
 Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu Val Gln Tyr Ala Arg Cys  
 260 265 270  
 Met Pro His Phe Ser Ala Leu Gln Leu Glu Asp Gln Val Thr Leu Leu  
 275 280 285  
 Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala Ser Ile Ala Trp Arg Ser  
 290 295 300  
 Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr Ser Thr Ser Ser Met Ser  
 305 310 315 320  
 Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro Pro Gly Pro Pro Glu Leu  
 325 330 335  
 Met Cys Phe Phe Pro Gly Met Thr Leu His Arg Asn Ser Ala Ile Gln  
 340 345 350

FC-4-1.ST25.txt

Ala Gly Val Gly Pro Ile Phe Asp Arg Val Leu Ser Glu Leu Ser Val  
355 360 365

Lys Met Arg Arg Met Asp Leu Asp Arg Ala Glu Leu Gly Cys Leu Lys  
370 375 380

Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg Gly Leu Lys Cys Arg Gln  
385 390 395 400

Glu Val Asp Ala Leu Arg Glu Lys Val Tyr Ala Cys Leu Asp Glu His  
405 410 415

Cys Arg Thr Gln His Pro Ala Glu Glu Gly Arg Phe Ala Ala Leu Leu  
420 425 430

Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser Leu Lys Cys Leu Asp His  
435 440 445

Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr Pro Leu Glu Ser Phe Leu  
450 455 460

Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
465 470

<210> 37  
<211> 1422  
<212> DNA  
<213> Ctenocephalides felis

<400> 37  
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caatctgaag aaaaacaggt gatcgagaca tttcaaagag attgacctca gagctggcag 120  
gcgaagcagc agggctgcga aacgacctc ttccgctgga tgctgcgtcc tgcaatgctc 180  
gtccaggcac gcgtaaacct tttctcgtaa agcatccact tcctgtctac atttcagtcc 240  
tcgaatatca ggattaaaca gtattatagc cttcaaacag cctaattctg ctctgtccaa 300  
atccattctt ctcatcttga cacttaattc tgacagtacc cgatcgaaaa taggtccgac 360  
gccagcctgg attgcactat tccgatgtaa cgtcatacca ggaaagaaac acattaattc 420  
aggcggctct ggtggagcgc gtctccttgt tgaagtatca ctagacatac tggacgtact 480  
tgtttctgca tcggattcta gatactcaat acttctccag gctatagatg ctataagtaa 540  
ttcattccag gctgctctga gtaacgttac ttgatcctct aattgtaaag cactaaaatg 600  
cggcatgcac cttgcgtatt gtactaactg atataactgt ttatttgctt gctgacacag 660

FC-4-1.ST25.txt

actggataca gggcccttgt atctaggagg caccatggat gaaggctcta ctcgcaaata	720
ttgtatcgac aattccgggt ccgtcgcaac atttcgagtt tcactccttt gttctgcttc	780
taaaattctt tctaccgtta aatcacgaac agaacttgctc gggtttgcttt cttcattatt	840
ctttgctcct cgttgtcggt cttcctgcac ggcttctcgt ttcattccac aggcgagaca	900
tttctgatat cgacagaact gacatcgatt tctctgcctt ttgtcgatca aacaatttct	960
atcctctcga caggcatacg tcagatcttt tcgtaccgtc cgtttgaaaa atcccttaca	1020
accttcgcaa ctgtaaacac cataatgctt cccggaagcc ctatctccgc atatggagca	1080
cagatgtttt gaccgcgtca aaggatgatt tggagggtat ggtgatttcg tttgggcgcc	1140
cgtggccgtg tttcctgata ctattgtgtg attttgacca aaaggcggac tagcgggact	1200
gccgacaact gcgccgccac tgccgggcca aaagccgccg ttcagtagcg caggatccgg	1260
tttcatatcc ggcagtgaga gcggtcccat cgagctcatt gacagccctt ggtcgagggc	1320
caagcctgta aggccagata atcctcgtcc ccatatttga ttctgagcgg ctcttgaat	1380
caaagccgtc acagacatca taggcttctc ttttttcac at	1422

<210> 38  
 <211> 612  
 <212> DNA  
 <213> Ctenocephalides felis

<400> 38	
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ggtttaccag cttttaccaa aataccacaa gaagatcaaa taacattatt aaaggcatgt	180
tcaagtgaag taatgatgct gcgaatggct cggcgggtacg atgcagtgtc ggattcaatc	240
ttattcgcca ataatcgttc atatactcgt gactcctata aaatggctgg tatggcagat	300
acaatagaag atctattgca tttttgtcga cagatgtata ctatgactgt agacaatgtg	360
gagtatgcac taataacagc aattgtgatt ttttcagatc gacctggatt ggaacaagca	420
gatcttgtgg aacaaattca aagttattac atcaaaacat taaagtgcta ctttttgaat	480
cgacatagtg gtgaccctaa gtgtggaata ttgtttgcc aacttctttc tattcttact	540
gaattacgca cgttaggaaa tcaaaactca gaaatgtgtt ttgcactgaa attgaagaac	600
agaaaacttc ct	612

<210> 39  
 <211> 612

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 39

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aggaagtttt ctgttcttca atttcagtgc aaaacacatt tctgagtttt gatttcctaa      60
cgtgcgtaat tcagtaagaa tagaaagaag tttggcaaac aatattccac acttagggtc      120
accactatgt cgattcaaaa tgtagcactt taatgttttg atgtaataac tttgaatttg      180
ttccacaaga tctgcttggt ccaatccagg tcgatctgaa aaaatcacia ttgctgttat      240
tagtgcatac tccacattgt ctacagtcac agtatacatc tgtcgacaaa aatgcaatag      300
atcttctatt gtatctgcca taccagccat tttataggag tcacgagtat atgaacgatt      360
attcgcgaat aagattgaat cgcacactgc atcgtaccgc cgagccattc gcagcatcat      420
tacttcactt gaacatgcct ttaataatgt tatttgatct tcttgtggta ttttggtaaa      480
agctggtaaa ccccttgcaa attccactat aagctgcaca gtaagtatgg taatttcagt      540
tatatgccga aattcaagag cttcatcttc agctgggtga cttatcatta tccttcgtag      600
gtcttcctca ga                                          612

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&lt;210&gt; 40

&lt;211&gt; 776

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 40

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ttgtcgatac aatatttgcg agtaggacct tcatccatgg tgcttcctag atacaagggc      120
cctgtatcca gtctgtgtca gcaagcaaatt aaacagttat atcagttagt acaatacgca      180
aggtgcatgc cgcattttag tgctttacaa ttagaggatc aagtaacgtt actcagagca      240
gcctggaatg aattacttat agcatctata gcctggagaa gtattgagta tctagaatcc      300
gatgcagaaa caagtacgtc cagtatgtct agtgatactt caacaaggag acgcgctcca      360
ccaggaccgc ctgaattaat gtgtttcttt cctgggtatga cgttacatcg gaatagtgca      420
atccaggctg gcgtcggacc tattttcgat cgggtactgt cagaattaag tgtcaaaatg      480
agaagaatgg atttggacag agcagaatta ggctgtttga aggctataat actgtttaat      540
cctgatattc gaggactgaa atgtagacag gaagtggatg ctttacgaga aaaggtttac      600
gcgtgcctgg acgagcattg caggacgcag catccagcgg aagagggtcg tttcgcagcc      660
ctgctgcttc gcctgccagc tctgaggtca atctctttga aatgtctcga tcacctgttt      720
ttcttcagat tgattggcga tacgccgctt gagagttttc ttgtggattt actcga      776

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FC-4-1.ST25.txt

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<210> 41
<211> 776
<212> DNA
<213> Ctenocephalides felis

<400> 41
tcgagtaa at ccacaagaaa actctcaagc ggcgtatcgc caatcaatct gaagaaaaac 60
aggatgatcga gacatttcaa agagattgac ctcagagctg gcaggcgaag cagcagggct 120
gcgaaacgac cctcttccgc tggatgctgc gtctcgcaat gctcgctccag gcacgcgtaa 180
accttttctc gtaaagcatt cacttctctgt ctacatttca gtctctgaat atcaggatta 240
aacagtatta tagccttcaa acagccta at tctgctctgt ccaaattcat tcttctcatt 300
ttgacactta attctgacag taccgatcg aaaataggtc cgacgccagc ctggattgca 360
ctattccgat gtaacgtcat accaggaaag aaacacatta attcaggcgg tcttggtgga 420
gcgcgctctcc ttgttgaagt atcactagac atactggacg tacttggttc tgcacgggat 480
tctagatact caatacttct ccaggctata gatgctataa gtaattcatt ccaggctgct 540
ctgagtaacg ttacttgatc ctctaattgt aaagcactaa aatgcggcat gcaccttgcg 600
tattgtacta actgatataa ctgtttatct gcttgctgac acagactgga tacaggggccc 660
ttgtatctag gaggcacat ggatgaaggt cctactcgca aatattgtat cgacaattcc 720
gggtccgctc caacatttct agtttctctc ctttggtctg cttctaaaat tctttc 776

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<210> 42
<211> 943
<212> DNA
<213> Ctenocephalides felis

<400> 42
gaggtatata ttaatgtatc gattaaataa ggaggaataa accatggggg gttctcatca 60
tcatcatcat catggtatgg ctagcatgac tggatggacag caaatgggtc gggatctgta 120
cgacgatgac gataaggatc cctctgttcg agatttaacg gtagaaagaa ttttagaagc 180
ggaacaaagg agtgaaactc gaaatgttgc gacggaccgc gaattgtcga tacaatattt 240
gcgagtagga cttcatcca tggatgctcc tagatacaag ggccctgtat ccagtctgtg 300
tcagcaagca aataaacagt tatatcagtt agtacaatac gcaagggtgca tgccgcattt 360
tagtgcttta caattagagg atcaagtaac gttactcaga gcagcctgga atgaattact 420
tatagcatct atagcctgga gaagtattga gtatctagaa tccgatgcag aaacaagtac 480
gtccagtatg tctagtata cttcaacaag gagacgcgct ccaccaggac cgcctgaatt 540
aatgtgtttc cttcttggtg tgacgttaca tcggaatagt gcaatccagg ctggcgtcgg 600

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FC-4-1.ST25.txt

acctaatttc gatcgggtac tgtcagaatt aagtgtcaaa atgagaagaa tggattttgga 660  
cagagcagaa ttaggctggt tgaaggctat aatactgttt aatcctgata ttcgaggact 720  
gaaatgtaga caggaagtgg atgctttacg agaaaagggt tacgcgtgcc tggacgagca 780  
ttgcaggacg cagcatccag cggaagaggg tcgtttcgca gccctgctgc ttcgcctgcc 840  
agctctgagg tcaatctctt tgaaatgtct cgatcacctg tttttcttca gattgattgg 900  
cgatacgccg cttgagagtt ttcttgtgga ttactcgag gcc 943

<210> 43  
<211> 943  
<212> DNA  
<213> Ctenocephalides felis

<400> 43  
ggcctcgagt aaatccacaa gaaaactctc aagcggcgta tcgccaatca atctgaagaa 60  
aaacaggtga tcgagacatt tcaaagagat tgacctcaga gctggcaggc gaagcagcag 120  
ggctgcgaaa cgaccctctt ccgctggatg ctgcgtcctg caatgctcgt ccaggcacgc 180  
gtaaaccttt tctcgtaaag catccacttc ctgtctacat ttcagtcctc gaatatcagg 240  
attaaacagt attatagcct tcaaacagcc taattctgct ctgtccaaat ccattcttct 300  
cattttgaca cttaattctg acagtaccgc atcgaaatta ggtccgacgc cagcctggat 360  
tgcactattc cgatgtaacg tcataccagg aaggaaacac attaattcag gcggtcctgg 420  
tggagcgcgt ctcttgttg aagtatcact agacatactg gacgtacttg tttctgcatc 480  
ggattctaga tactcaatac ttctccaggc tatagatgct ataagtaatt cattccaggc 540  
tgctctgagt aacgttactt gatcctctaa ttgtaaagca ctaaaatgcg gcatgcacct 600  
tgcgtattgt actaactgat ataactgttt atttgcttgc tgacacagac tggatacagg 660  
gcccttgtat ctaggaggca ccatggatga aggtcctact cgcaaataat gtatcgacaa 720  
ttccgggtcc gtcgcaacat ttcgagtttc actcctttgt tccgcttcta aaattctttc 780  
taccgttaaa tctcgaacag agggatcctt atcgatcatc tcgtacagat cccgacccat 840  
ttgctgtcca ccagtcatgc tagccatacc atgatgatga tgatgatgag aaccccccat 900  
ggtttattcc tccttattta atcgatacat taatatatac ctc 943

<210> 44  
<211> 21  
<212> DNA  
<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 44

tgygaaatgg ayatgtayat g

21

<210> 45

<211> 20

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<220>

<221> misc\_feature

<222> (15)..(15)

<223> n = unknown

<400> 45

ccyttwgcra attcnacdat

20

<210> 46

<211> 18

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 46

ggttcccgaa aaccaatg

18

<210> 47

<211> 19

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 47

gccgaaattc aagagcttc

19

<210> 48

<211> 18

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 48

gtcaggaatg taggctca

18



<210> 49  
 <211> 20  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic Primer

<400> 49  
 aattaaccct cactaaaggg

20

<210> 50  
 <211> 20  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic Primer

<400> 50  
 ggwaaacayt atggwgtwta

20

<210> 51  
 <211> 18  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic Primer

<220>  
 <221> misc\_feature  
 <222> (10)..(10)  
 <223> n = unknown

<400> 51  
 ttcttcytgn acwhcttc

18

<210> 52  
 <211> 20  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic Primer

<400> 52  
 ttctcgtttc attccacagg

20

<210> 53  
 <211> 29  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic Primer  
  
 <400> 53  
 aaaggggaaca aaagctggag ctccaccgc 29  
  
 <210> 54  
 <211> 28  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic Primer  
  
 <400> 54  
 ttaaaatatc actggttcgt atcctccc 28  
  
 <210> 55  
 <211> 26  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic Primer  
  
 <400> 55  
 ggcggccgct ctagaactag tggatc 26  
  
 <210> 56  
 <211> 23  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic Primer  
  
 <400> 56  
 agacaatcaa tatcccaagt gcg 23  
  
 <210> 57  
 <211> 27  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic Primer  
  
 <400> 57  
 ctgcataaaa tgcctaaagt cgcggac 27  
  
 <210> 58  
 <211> 30  
 <212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 58

gcgggatccc aagatggata tgaacaacct

30

<210> 59

<211> 36

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 59

gcggaattct caatcccaaa tttcttctaa aaatct

36

<210> 60

<211> 31

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 60

gcgggatccc tctgttcgag atttaacggt a

31

<210> 61

<211> 27

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 61

gcgaagcttt caaccgatgg gtccgcc

27

<210> 62

<211> 36

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 62

gcgcccgggg gattaacttt attattaaaa attaaa

36

<210> 63

<211> 33

<212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic Primer

<400> 63  
 gcgcgcggcc gcaagctttc aaccgatggg tcc

33

<210> 64  
 <211> 66  
 <212> PRT  
 <213> Ctenocephalides felis

<400> 64

Cys Leu Val Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu  
 1 5 10 15

Thr Cys Glu Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn  
 20 25 30

Ala Val Tyr Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr  
 35 40 45

Met Arg Arg Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val  
 50 55 60

Gly Met  
 65

<210> 65  
 <211> 219  
 <212> PRT  
 <213> Ctenocephalides felis

<400> 65

Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp Leu Arg Arg Ile Met  
 1 5 10 15

Ile Ser Thr Pro Ala Glu Asp Glu Ala Leu Glu Phe Arg His Ile Thr  
 20 25 30

Glu Ile Thr Ile Leu Thr Val Gln Leu Ile Val Glu Phe Ala Lys Gly  
 35 40 45

Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp Gln Ile Thr Leu Leu  
 50 55 60

FC-4-1.ST25.txt

Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg Met Ala Arg Arg Tyr  
65 70 75 80

Asp Ala Val Ser Asp Ser Ile Leu Phe Ala Asn Asn Arg Ser Tyr Thr  
85 90 95

Arg Asp Ser Tyr Lys Met Ala Gly Met Ala Asp Thr Ile Glu Asp Leu  
100 105 110

Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr Val Asp Asn Val Glu  
115 120 125

Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser Asp Arg Pro Gly Leu  
130 135 140

Glu Gln Ala Asp Leu Val Glu Gln Ile Gln Ser Tyr Tyr Ile Lys Thr  
145 150 155 160

Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly Asp Pro Lys Cys Gly  
165 170 175

Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr Glu Leu Arg Thr Leu  
180 185 190

Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu Lys Leu Lys Asn Arg  
195 200 205

Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp  
210 215

<210> 66  
<211> 66  
<212> PRT  
<213> Ctenocephalides felis

<400> 66

Cys Leu Val Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu  
1 5 10 15

Thr Cys Glu Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn  
20 25 30

Ala Val Tyr Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr  
35 40 45

FC-4-1.ST25.txt

Met Arg Arg Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val  
50 55 60

Gly Met  
65

<210> 67  
<211> 219  
<212> PRT  
<213> Ctenocephalides felis

<400> 67

Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp Leu Arg Arg Ile Met  
1 5 10 15

Ile Ser Thr Pro Ala Glu Asp Glu Ala Leu Glu Phe Arg His Ile Thr  
20 25 30

Glu Ile Thr Ile Leu Thr Val Gln Leu Ile Val Glu Phe Ala Lys Gly  
35 40 45

Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp Gln Ile Thr Leu Leu  
50 55 60

Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg Met Ala Arg Arg Tyr  
65 70 75 80

Asp Ala Val Ser Asp Ser Ile Leu Phe Ala Asn Asn Arg Ser Tyr Thr  
85 90 95

Arg Asp Ser Tyr Lys Met Ala Gly Met Ala Asp Thr Ile Glu Asp Leu  
100 105 110

Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr Val Asp Asn Val Glu  
115 120 125

Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser Asp Arg Pro Gly Leu  
130 135 140

Glu Gln Ala Asp Leu Val Glu Gln Ile Gln Ser Tyr Tyr Ile Lys Thr  
145 150 155 160

Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly Asp Pro Lys Cys Gly  
165 170 175

FC-4-1.ST25.txt

Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr Glu Leu Arg Thr Leu  
180 185 190

Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu Lys Leu Lys Asn Arg  
195 200 205

Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp  
210 215

<210> 68  
<211> 66  
<212> PRT  
<213> Ctenocephalides felis

<400> 68

Cys Ser Ile Cys Gly Asp Arg Ala Ser Gly Lys His Tyr Gly Val Tyr  
1 5 10 15

Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys Arg Thr Val Arg Lys Asp  
20 25 30

Leu Thr Tyr Ala Cys Arg Glu Asp Arg Asn Cys Leu Ile Asp Lys Arg  
35 40 45

Gln Arg Asn Arg Cys Gln Phe Cys Arg Tyr Gln Lys Cys Leu Ala Cys  
50 55 60

Gly Met  
65

<210> 69  
<211> 271  
<212> PRT  
<213> Ctenocephalides felis

<400> 69

Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu Gln Arg  
1 5 10 15

Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile Gln Tyr  
20 25 30

Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys Gly Pro  
35 40 45

FC-4-1.ST25.txt

Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu Val  
50 55 60

Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu Gln Leu Glu Asp  
65 70 75 80

Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala Ser  
85 90 95

Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr Ser  
100 105 110

Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro Pro  
115 120 125

Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu His Arg  
130 135 140

Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg Val Leu  
145 150 155 160

Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg Ala Glu  
165 170 175

Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg Gly  
180 185 190

Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val Tyr Ala  
195 200 205

Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu Gly Arg  
210 215 220

Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser Leu  
225 230 235 240

Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr Pro  
245 250 255

Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
260 265 270

<210> 70  
<211> 66  
<212> PRT



&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 70

Cys Ser Ile Cys Gly Asp Arg Ala Ser Gly Lys His Tyr Gly Val Tyr  
1 5 10 15

Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys Arg Thr Val Arg Lys Asp  
20 25 30

Leu Thr Tyr Ala Cys Arg Glu Asp Arg Asn Cys Leu Ile Asp Lys Arg  
35 40 45

Gln Arg Asn Arg Cys Gln Phe Cys Arg Tyr Gln Lys Cys Leu Ala Cys  
50 55 60

Gly Met  
65

&lt;210&gt; 71

&lt;211&gt; 271

&lt;212&gt; PRT

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 71

Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu Gln Arg  
1 5 10 15

Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile Gln Tyr  
20 25 30

Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys Gly Pro  
35 40 45

Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu Val  
50 55 60

Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu Gln Leu Glu Asp  
65 70 75 80

Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala Ser  
85 90 95

Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr Ser  
100 105 110

FC-4-1.ST25.txt

Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro Pro  
115 120 125

Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu His Arg  
130 135 140

Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg Val Leu  
145 150 155 160

Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg Ala Glu  
165 170 175

Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg Gly  
180 185 190

Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val Tyr Ala  
195 200 205

Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu Gly Arg  
210 215 220

Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser Leu  
225 230 235 240

Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr Pro  
245 250 255

Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
260 265 270

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